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**Bibliography**

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**Summary**

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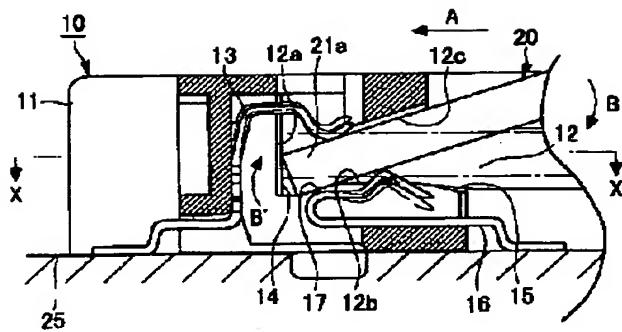
(57) [Abstract]

[Technical problem] In case a connector is equipped with a card, a contact terminal is buckled, or it prevents that housing material can be deleted, and a reliable connector is offered.

[Means for Solution] The slot 12 for holding a card 20 is formed in housing 11. Two or more heights 14 which extend crosswise [ of this slot ] are formed in bottom 12a of this slot 12. Moreover, on guide side 12b near the opening of this slot 12, the slant-face section 15 which extends opening of this slot 12 is formed.

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**CLAIMS**

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[Claim(s)]

[Claim 1] The connector for connecting to the 1st circuit board the 2nd circuit board which has the 1st edge in which two or more electrodes which are characterized by providing the following, and which should be connected to the 1st circuit board were formed, and the 2nd edge which counters this 1st edge Housing by which mould fabrication was carried out from an insulating material The slot the aforementioned housing and really fabricated in order to hold the 1st edge of the 2nd circuit board the latch prepared in the aforementioned housing so that it might extend from near the both ends of the aforementioned slot in order to pinch the 2nd circuit board of the above from the edges on both sides, when inserting the 1st edge of the above of the 2nd circuit board of the above in the aforementioned slot and rotating the 2nd edge of the above of the 2nd circuit board in the predetermined direction centering on this 1st edge — a member Heights the aforementioned housing and really fabricated so that it might extend crosswise [ of two or more contact terminals for connecting electrically the 1st circuit board of the above, and

the 2nd circuit board of the above by being arranged at one / at least / wall surface near the pars basilaris ossis occipitalis of the aforementioned slot, and contacting elastically two or more aforementioned electrodes of the 2nd circuit board of the above, and the pars basilaris ossis occipitalis of the aforementioned slot ]

[Claim 2] The aforementioned heights are connectors according to claim 1 currently formed in the position which counters the portion by which two or more contact terminals of the aforementioned wall surface are not arranged in the pars basilaris ossis occipitalis of the aforementioned slot. [ two or more ]

[Claim 3] The aforementioned heights are connectors according to claim 1 currently formed near the both ends of the length direction of the pars basilaris ossis occipitalis of the aforementioned slot.

[Claim 4] The connector for connecting to the 1st circuit board the 2nd circuit board which has the 1st edge in which two or more electrodes which are characterized by providing the following, and which should be connected to the 1st circuit board were formed, and the 2nd edge which counters this 1st edge Housing by which mould fabrication was carried out from an insulating material The slot the aforementioned housing and really fabricated in order to hold the 1st edge of the 2nd circuit board the latch prepared in the aforementioned housing so that it might extend from near the both ends of the aforementioned slot in order to pinch the 2nd circuit board of the above from the edges on both sides, when inserting the 1st edge of the above of the 2nd circuit board of the above in the aforementioned slot and rotating the 2nd edge of the above of the 2nd circuit board in the predetermined direction centering on this 1st edge --- a member The slant-face section the aforementioned housing and really formed near the opening of two or more contact terminals for connecting electrically the 1st circuit board of the above, and the 2nd circuit board of the above by being arranged at the wall surface near the bottom of the aforementioned slot which counters the aforementioned hand of cut at least, and contacting elastically two or more aforementioned electrodes of the 2nd circuit board of the above, and the wall surface which counters the aforementioned hand of cut of the aforementioned slot so that this opening might become large

[Claim 5] The aforementioned slant-face section is a connector according to claim 4 currently formed directly under two or more aforementioned contact terminals arranged at the wall surface of the aforementioned slot.

[Claim 6] The connector for connecting to the 1st circuit board the 2nd circuit board which has the 1st edge in which two or more electrodes which are characterized by providing the following, and which should be connected to the 1st circuit board were formed, and the 2nd edge which counters this 1st edge Housing by which mould fabrication was carried out from an insulating material The slot the aforementioned housing and really fabricated in order to hold the 1st edge of the 2nd circuit board the latch prepared in the aforementioned housing so that it might extend from near the both ends of the aforementioned slot in order to pinch the 2nd circuit board of the above from the edges on both sides, when inserting the 1st edge

of the above of the 2nd circuit board of the above in the aforementioned slot and rotating the 2nd edge of the above of the 2nd circuit board in the predetermined direction centering on this 1st edge -- a member The level difference section the aforementioned housing and really formed near the opening of two or more contact terminals for connecting electrically the 1st circuit board of the above, and the 2nd circuit board of the above by being arranged at the wall surface near the bottom of the aforementioned slot which counters the aforementioned hand of cut at least, and contacting elastically two or more aforementioned electrodes of the 2nd circuit board of the above, and the wall surface which counters the aforementioned hand of cut of the aforementioned slot so that this opening might become large

[Claim 7] The connector according to claim 6 by which beveling processing is given to the edge of the 1st edge of the 2nd circuit board of the above.

[Claim 8] The aforementioned latch member is a connector according to claim 1 to 7 which supports this 2nd circuit board so that the 2nd circuit board of the above may extend along with the 1st circuit board of the above.

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#### DETAILED DESCRIPTION

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##### [Detailed Description of the Invention]

###### [0001]

[The technical field to which invention belongs] this invention relates to the connector for connecting memory card and an IC card to a mounting substrate.

###### [0002]

[Description of the Prior Art] In order to extend a function to a computer, a telecommunication device, etc., the connector which connects the circuit board, memory card, an IC card, etc. mutually is called an "edge connector", and, generally is used.

[0003] The partial cross section of the conventional connector is shown in drawing 7 . The connector with which the circuit board 65 is equipped has the insulating

housing 51, and the slot 52 for holding the end section of a card 60 is formed in this housing 51. Inside this slot 52, two or more contact terminals 53 electrically connected with each terminal of the circuit board 65 are arranged.

[0004] In case this connector is equipped with a card 60, first, end section 60a of a card 60 is inserted in opening of a slot 52 from across to the circuit board 65, and a card 60 is moved in the direction of a in drawing along with wall surface ("guide side" is called hereafter) 52b by the side of the circuit board 65 of a slot 52. and the thing for which this card 60 is depressed in the direction of b in drawing toward the front face of the circuit board 65 centering on the direction of a side edge of edge 60a of the card 60 inserted in this slot 52 (direction which intersects perpendicularly with space) -- the card 60 concerned -- circuit board 65 front face -- receiving -- abbreviation -- a connector is equipped so that it may become parallel At this time, two or more solder pads which were prepared near the edge 60a of card 60 front face inserted into the slot 52 and which are not illustrated contact elastically the contact terminal 53 arranged inside a slot 52.

[0005]

[Problem(s) to be Solved by the Invention] If a card 60 is inserted in a slot 52 and it depresses in the direction of b in drawing in the case of wearing to the connector of a card 60, edge 60a inserted into the slot 52 of a card 60 will move by the structure of the conventional connector which was mentioned above in the direction of b', as shown in drawing 7 . At this time, as shown in the portion surrounded by the round mark in drawing, the side edge of edge 60a is moved, where pars-basilaris-ossis-occipitalis 52a of a slot 52 is contacted. For this reason, a part of pars-basilaris-ossis-occipitalis 52a of a slot 52, i.e., housing material, will be deleted by edge 60a of a card 60. Thus, shaving or \*\* of housing material to generate may cause the poor contact between each electrode-contact terminal by entering between each terminal of a card 60, and each contact terminal 53 in a slot 52.

[0006] Moreover, drawing 8 is a typical cross section in which it is shown near the guide side 52b of the slot 52 on drawing 7 for explaining the problem produced in case a card 60 is inserted into a slot 52. As this drawing 8 middle point line shows, in case it makes a card 60 contact guide side 52b of a slot 52 and it is moved in the direction of a in drawing, the side edge section of a card 60 makes a contact terminal 53 buckle, and, for this reason, the problem that the poor contact between each electrode-contact terminal arises also has it. In order to solve this problem, the method of putting to sleep and arranging the angle to guide side 52a of each contact terminal 53 is mentioned. However, if this method is adopted, the nose of cam of a contact terminal 53 will become long as a result. For this reason, when each contact terminal 53 arranged at guide side 52b when each electrode and each contact terminal 53 of a card 60 contact elastically was depressed at a circuit board 65 side, the nose of cam of each terminal 53 contacted the support section, and caused degradation of equipment.

[0007] Then, let it to offer a reliable connector be the technical problem of this

invention by preventing the problem produced in case a connector is equipped with a card which was mentioned above.

[0008]

[Means for Solving the Problem] The 1st mode of the connector by this invention for solving the above-mentioned technical problem The 2nd circuit board which has the 1st edge in which two or more electrodes which should be connected to the 1st circuit board were formed, and the 2nd edge which counters this 1st edge In order to hold housing by which is a connector for connecting with the 1st circuit board, and mould fabrication was carried out from an insulating material, and the 1st edge of the 2nd circuit board When inserting the aforementioned housing, the really fabricated slot, and the 1st edge of the above of the 2nd circuit board of the above in the aforementioned slot and rotating the 2nd edge of the above of the 2nd circuit board in the predetermined direction centering on this 1st edge The latch member prepared in the aforementioned housing so that it might extend from near the both ends of the aforementioned slot in order to pinch the 2nd circuit board of the above from the edges on both sides, Two or more contact terminals for connecting electrically the 1st circuit board of the above, and the 2nd circuit board of the above by being arranged at one [ at least ] wall surface near the bottom of the aforementioned slot, and contacting elastically two or more aforementioned electrodes of the 2nd circuit board of the above, It has the aforementioned housing and the really fabricated heights so that it may extend crosswise [ of the bottom of the aforementioned slot ] (it corresponds to a claim 1).

[0009] That is, the connector of \*\*\*\* 1 mode is characterized by having the heights which extend crosswise [ of this pars basilaris ossis occipitalis ] at the pars basilaris ossis occipitalis of the slot for holding the 2nd circuit board. For this reason, when the 2nd circuit board is inserted in the slot concerned, the 1st edge of the 2nd circuit board inserted in this slot contacts only the heights formed in the groove bottom section. Therefore, since a touch area with the connector of the 1st edge of the 2nd circuit board in the case of equipping a connector with the 2nd circuit board can be decreased, problems, such as shaving generated by friction with the 2nd circuit board and housing and a poor contact resulting from \*\*, can be prevented.

[0010] In addition, in case the connector of the 1st mode of the above is adopted, in the pars basilaris ossis occipitalis of the aforementioned slot, two or more aforementioned heights may be formed in the position which counters the portion by which two or more contact terminals of the aforementioned wall surface are not arranged, and may be formed near the both ends of the length direction of the pars basilaris ossis occipitalis of the aforementioned slot (it corresponds to a claim 3). (it corresponds to a claim 2) Since the generating part of shaving or \*\* can be limited to the place distant from the contact terminal by adopting such composition, it is hard coming to generate problems, such as a poor contact.

[0011] Moreover, the 2nd mode of the connector of this invention for solving the above-mentioned technical problem The 2nd circuit board which has the 1st edge in

which two or more electrodes which should be connected to the 1st circuit board were formed, and the 2nd edge which counters this 1st edge In order to hold housing by which is a connector for connecting with the 1st circuit board, and mould fabrication was carried out from an insulating material, and the 1st edge of the 2nd circuit board When inserting the aforementioned housing, the really fabricated slot, and the 1st edge of the above of the 2nd circuit board of the above in the aforementioned slot and rotating the 2nd edge of the above of the 2nd circuit board in the predetermined direction centering on this 1st edge The latch member prepared in the aforementioned housing so that it might extend from near the both ends of the aforementioned slot in order to pinch the 2nd circuit board of the above from the edges on both sides, It is arranged at the wall surface near the bottom of the aforementioned slot which counters the aforementioned hand of cut at least. Two or more contact terminals for connecting electrically the 1st circuit board of the above, and the 2nd circuit board of the above by contacting elastically two or more aforementioned electrodes of the 2nd circuit board of the above, Near the opening of the wall surface which counters the aforementioned hand of cut of the aforementioned slot, it has the aforementioned housing and the really formed slant-face section so that this opening may become large (it corresponds to a claim 4).

[0012] That is, since the slant-face section formed so that this opening might become large is formed near the opening of the slot for holding the 2nd circuit board, the connector of this mode can prevent buckling the contact terminal arranged at Mizouchi.

[0013] In addition, in case the connector of the 2nd mode of the above is adopted, the aforementioned slant-face section may be formed directly under two or more aforementioned contact terminals arranged at the wall surface of the aforementioned slot (it corresponds to a claim 5).

[0014] Moreover, the 3rd mode of the connector of this invention for solving the above-mentioned technical problem The 2nd circuit board which has the 1st edge in which two or more electrodes which should be connected to the 1st circuit board were formed, and the 2nd edge which counters this 1st edge In order to hold housing by which is a connector for connecting with the 1st circuit board, and mould fabrication was carried out from an insulating material, and the 1st edge of the 2nd circuit board When inserting the aforementioned housing, the really fabricated slot, and the 1st edge of the above of the 2nd circuit board of the above in the aforementioned slot and rotating the 2nd edge of the above of the 2nd circuit board in the predetermined direction centering on this 1st edge The latch member prepared in the aforementioned housing so that it might extend from near the both ends of the aforementioned slot in order to pinch the 2nd circuit board of the above from the edges on both sides, It is arranged at the wall surface near the bottom of the aforementioned slot which counters the aforementioned hand of cut at least. Two or more contact terminals for connecting electrically the 1st circuit board of the above, and the 2nd circuit board of the above by contacting elastically two or

more aforementioned electrodes of the 2nd circuit board of the above, Near the opening of the wall surface which counters the aforementioned hand of cut of the aforementioned slot, it has with the aforementioned housing and the really formed level difference section so that this opening may become large (it corresponds to a claim 6). Even when the connector of such composition is adopted, buckling of a contact terminal can be prevented like the connector of the 2nd mode. At this time, it is desirable to give beveling processing to the edge of the 1st edge of the 2nd circuit board of the above (it corresponds to a claim 7).

[0015] In addition, when using the connector of each above-mentioned mode, the aforementioned latch member may support this 2nd circuit board so that the 2nd circuit board of the above may extend along with the 1st circuit board of the above (it corresponds to a claim 8).

[0016]

[Embodiments of the Invention] Hereafter, the gestalt of operation of this invention is explained based on a drawing. Drawing 1 is the perspective diagram showing the structure of the card 20 connected to the connector 10 by the operation gestalt of this invention, and this connector 10, and drawing 2 is a cross section along the field perpendicular to the longitudinal direction of a connector 10. Moreover, drawing 3 is the cross section which met the X-X line of drawing 2 . Hereafter, the structure of the connector by the 1st operation gestalt of this invention is explained using drawing 1 or drawing 3 . This connector 10 is used in the state where it was mounted on the circuit boards 25, such as a memory control board.

[0017] It is DIMM (dual inline memory module), and the card 20 as the 2nd circuit board has two or more solder pads 22 formed on the card substrate 21 in which two or more circuits which are not illustrated were formed, and this substrate 21. Each solder pad 22 is put in order and formed on both sides of one side edge 21a of the longitudinal direction of the card substrate 21. The solder pad 22 is arranged mostly at equal intervals [ near the center of the longitudinal direction of both sides of the card substrate 21 ]. Moreover, notch section 21a which cuts a part of this card substrate 21 in the shape of a semicircle, and comes to lack it is formed in the edges on both sides of the direction of a short hand of the card substrate 21.

[0018] The connector 10 for connecting a card 20 to the circuit board 25 as the 1st circuit board is equipped with the housing 11 which comes to carry out mould fabrication of the insulating material, such as plastic material. Housing 11 consists of two flank walls 11b which extended in the right-angled direction from the both ends of the longitudinal direction of base 11a which has a rectangular flat-surface configuration, and this base 11a. Base 11a has the slot 12 for holding the side edge in which the solder pad 22 of a card 20 was formed. On both the wall surfaces of this slot 12 interior, two or more contact terminals 13 and 16 which should contact the solder pad 22 of a card 20 are arranged. Respectively, the end section of each [ these ] contact terminals 13 and 16 penetrated housing 11, has extended outside, and is joined by solder to each terminal which the circuit board 25 does not illustrate.

[0019] Notch section 21b of the card 20 inserted into the slot 12 and fitting supporter 11c which should fit in are formed near the nose of cam of flank wall 11b of housing 11. These flank wall 11b and fitting supporter 11c constitute the latch member pinched by carrying out latch maintenance of the side edge section of the direction of a short hand of the card 20 inserted into the slot 12.

[0020] Moreover, two or more heights 14 which extend crosswise [ of this slot 12 ] are formed in bottom 12a of the slot 12 formed in housing 11. Drawing 4 is the partial perspective diagram of the slot 12 interior for explaining the structure of heights 14. In addition, illustration of each contact terminal 16 is omitted in this drawing 4 .

[0021] As shown in drawing 3 and drawing 4 , heights 14 are slightly projected to bottom 12a of a slot 12, and mould formation is carried out at housing 11 and one so that it may extend perpendicularly, i.e., the cross direction of this slot 12, to circuit board 25 front face which mounts a connector 10. Each [ these ] heights 14 are formed in a part for the both ends of the length direction of bottom 12a of a slot 12, and an abbreviation center section. That is, each heights 14 are formed in the position which counters the portion in which each contact terminal 13 of wall surfaces 12b and 12c is not formed in bottom 12a of a slot 12. Therefore, side edge 21a of the card 20 inserted in the slot 12 is contacted by only each [ these ] heights 14.

[0022] Moreover, as shown in drawing 2 and drawing 4 , in order that wall surface 12b (it is hereafter written as "guide side 12b") of a slot 12 may insert a card 20 in this slot 12 towards the direction of slant to the circuit board 25, the ramp 17 formed so that width of face of opening of a slot 12 might be made small is formed. Furthermore, this guide side 12b has the slant-face section 15 formed so that opening of this slot 12 might become large near the opening of a slot 12.

[0023] Hereafter, the wearing method of the card 20 to the connector 10 of this operation form is explained using drawing 1 or drawing 4 . First, side edge 21a in which the solder pad 22 of a card 20 was formed is inserted in opening of the slot 12 of a connector 10. At this time, side edge 21a of a card 20 contacts guide side 12b. Thus, it is made to move in the direction of A in drawing 2 toward bottom 12a of a slot 12, making side edge 21a of a card 20 contact guide side 12b.

[0024] Then, a card 20 is energized by the slant-face section 15 of guide side 12b by the method of the diagonal left in drawing 2 . Thereby, since the angle of attack of a card 20 can be made small, the force applied to a contact terminal 16 can be suppressed smaller than before. Therefore, even in case a card 20 is inserted in a slot 12, it can prevent buckling a contact terminal 16.

[0025] If a card 20 is completely inserted in the slot 12 interior as shown in drawing 2 , side edge 21a of a card 20 will contact two or more heights 14 formed in bottom 12a of a slot 12. The other end which extended to the exterior of a slot 12 in this state centering on the longitudinal direction (direction which intersects perpendicularly with the space of drawing 2 ) of a card 20 is rotated in the circuit

board 25 side of B in drawing, i.e., the direction. then, notch section 21b of a card 20 fits into fitting supporter 11c of flank wall 11b of a connector 10, and this shows with the dashed line in drawing 2 — as — a card 20 — the circuit board 25 — receiving — abbreviation — it is held in the parallel state At this time, two or more solder pads 22 prepared in the side edge of the card substrate 21 and two or more contact terminals 13 and 16 arranged inside [ slot 12 ] a connector 10 contact elastically, respectively.

[0026] Moreover, if a card 20 rotates in the direction of B in drawing, side edge 21a of the card 20 inserted into the slot 12 will rotate in the direction of Bin drawing'. Since side edge 21a of a card 20 is in contact only with the heights 14 formed in pars-basilaris-ossis-occipitalis 12a of a slot 12 at this time as mentioned above, when side edge 21a rotates in the direction of B', the part where the insulating material which constitutes housing 11 is deleted by side edge 20a of a card 20 is limited to heights 14. Moreover, these heights 14 are formed in the both ends and center section of the length direction of the slot 12 in which each contact terminal 16 is not arranged. [ of pars-basilaris-ossis-occipitalis 12a ] Therefore, even when these heights 14 are deleted with a card 20, shaving or \*\* does not occur at the latest of each contact terminals 13 and 16. Therefore, in case a connector 10 is equipped with a card 20, it can prevent shaving or \*\* entering between each solder pad 22 of a card 20, and each contact terminals 13 and 16 of a connector 10. Therefore, the degradation of the solder pad 22 and the equipment by the poor contact of each contact terminals 13 and 16 can be prevented.

[0027] Drawing 5 and drawing 6 are the partial cross sections showing the modification of the connector by the operation gestalt of this invention. With the above-mentioned operation gestalt, the slant-face section 15 for buckling prevention of the contact terminal 16 at the time of equipping a connector with a card 20 is formed in the opening side of a slot 12 rather than each [ these ] contact terminal 16. However, the same effect is acquired, even when the slant-face section 31 is formed directly under each contact terminal 16 on guide side 12b of a slot 12, as shown not only in this but in drawing 5 . Moreover, rather than the contact terminal 16 on guide side 12b of a slot 12, as shown in drawing 6 , when card 20' by which beveling was performed to the side edge section is used, even if the level difference section 32 which extends this opening is formed in the position by the side of opening, the effect of buckling prevention of each contact terminal 16 can be acquired similarly.

[0028]

[Effect of the Invention] According to this invention, in case a connector is equipped with a card, a connector with the high reliability which does not make a contact terminal buckle can be offered. Moreover, according to this invention, in case a connector is equipped with a card, shaving generated since housing is shaved with the card concerned, or the poor contact resulting from \*\* can be prevented.

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] The perspective diagram showing the composition of the connector by the operation gestalt of this invention.

[Drawing 2] The partial cross section along the field perpendicular to the longitudinal direction of the connector by the operation gestalt of this invention.

[Drawing 3] The cross section which met the X-X line of drawing 2.

[Drawing 4] The partial perspective diagram showing the structure inside [ slot 12 ] the connector by the operation gestalt of this invention.

[Drawing 5] An about 16 contact terminal [ of the connector by the operation gestalt of this invention ] partial cross section.

[Drawing 6] An about 16 contact terminal [ of the connector by the operation gestalt of this invention ] partial cross section.

[Drawing 7] The cross section showing the structure of the connector of the conventional technology.

[Drawing 8] The cross section for explaining the trouble of the conventional technology.

[Description of Notations]

10 Connector

11 Housing

12 Slot

12a Pars basilaris ossis occipitalis

12b Guide side

13 16 Contact terminal

14 Heights

15 31 Slant-face section

20 20' Card

21 Card Substrate

22 Solder Pad  
25 Circuit Board  
31 Level Difference Section

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[Translation done.]

\* NOTICES \*

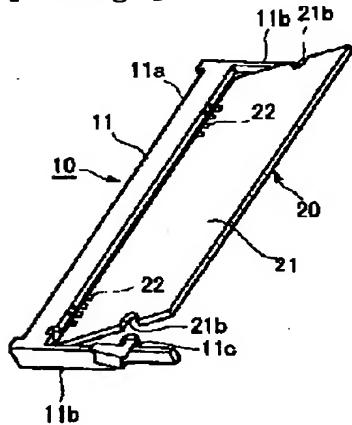
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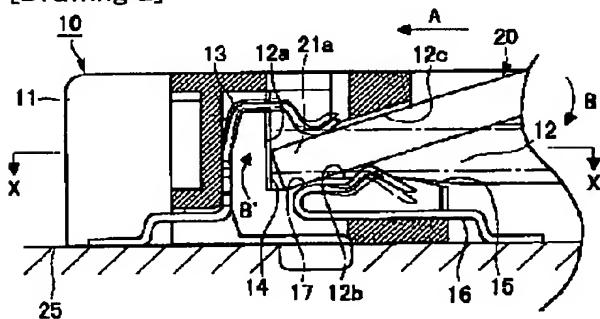
DRAWINGS

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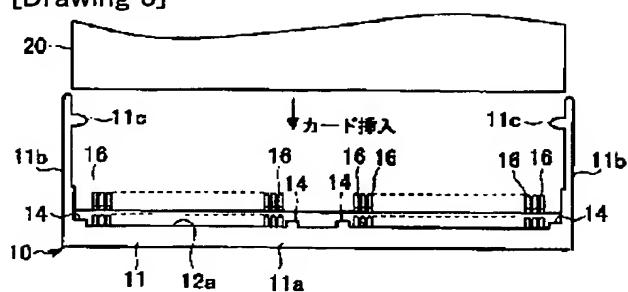
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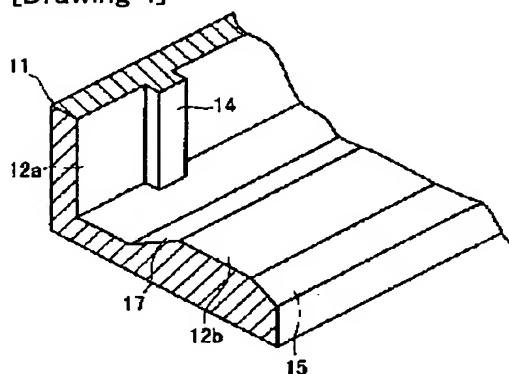
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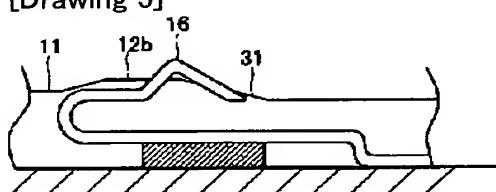
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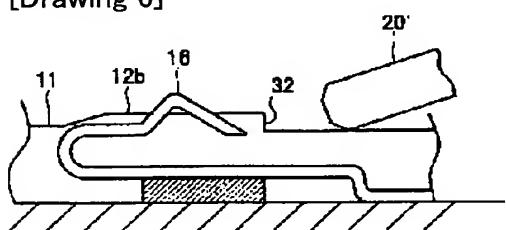
[Drawing 4]



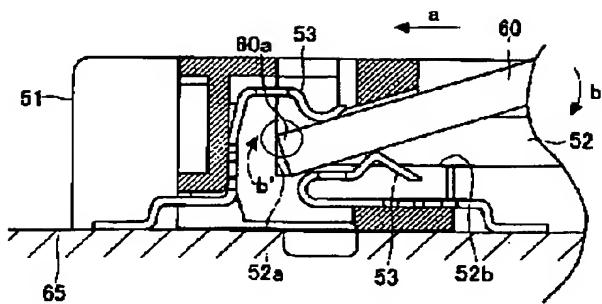
[Drawing 5]



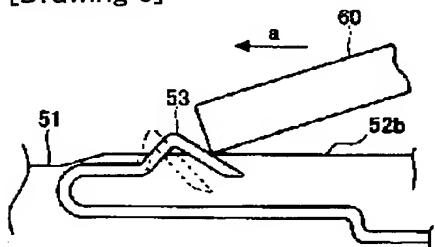
[Drawing 6]



[Drawing 7]



[Drawing 8]



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13/639

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13/639

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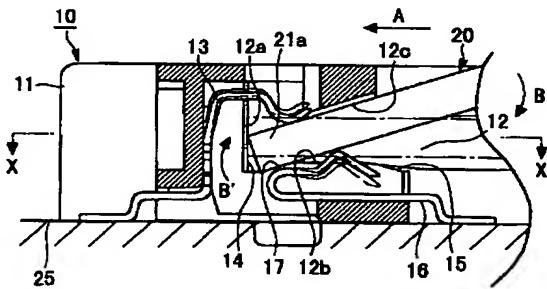
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(54)【発明の名称】 コネクタ

(57)【要約】

【課題】 カードをコネクタに装着する際に、接触端子が座屈されたり、ハウジング材料が削れることを防止し、信頼性の高いコネクタを提供する。

【解決手段】 ハウジング11には、カード20を収容するための溝12が形成されている。この溝12の底部12aには、この溝の幅方向に延在する複数の凸部14が形成されている。また、この溝12の開口部近傍のガイド面12b上には、この溝12の開口部を広げる斜面部15が形成されている。



## 【特許請求の範囲】

【請求項1】第1回路基板に接続されるべき複数の電極が形成された第1端部とこの第1端部に対向する第2端部を有する第2回路基板を、第1回路基板に接続するためのコネクタであって、  
絶縁性材料からモールド成形されたハウジングと、  
第2回路基板の第1端部を収容するために、前記ハウジングと一体成形された溝と、  
前記第2回路基板の前記第1端部を前記溝に挿入して、この第1端部を軸として第2回路基板の前記第2端部を所定方向に回転させたときに、前記第2回路基板をその両側縁から挟持するために、前記溝の両端部の近傍から延出されるように前記ハウジングに設けられたラッチ部材と、  
前記溝の底部近傍の少なくとも一方の壁面に配置され、前記第2回路基板の前記複数の電極と弾性的に接触することにより前記第1回路基板と前記第2回路基板を電気的に接続するための複数の接触端子と、  
前記溝の底部の幅方向に延在するように前記ハウジングと一体成形された凸部とを備えるコネクタ。

【請求項2】前記凸部は、前記溝の底部において、前記壁面の複数の接触端子が配置されていない部分に対向する位置に複数形成されている請求項1記載のコネクタ。  
【請求項3】前記凸部は前記溝の底部の長さ方向の両端部近傍に形成されている請求項1記載のコネクタ。

【請求項4】第1回路基板に接続されるべき複数の電極が形成された第1端部とこの第1端部に対向する第2端部を有する第2回路基板を、第1回路基板に接続するためのコネクタであって、  
絶縁性材料からモールド成形されたハウジングと、  
第2回路基板の第1端部を収容するために、前記ハウジングと一体成形された溝と、  
前記第2回路基板の前記第1端部を前記溝に挿入して、この第1端部を軸として第2回路基板の前記第2端部を所定方向に回転させたときに、前記第2回路基板をその両側縁から挟持するために、前記溝の両端部の近傍から延出されるように前記ハウジングに設けられたラッチ部材と、

前記溝の底部近傍の、少なくとも前記回転方向に対向する壁面に配置され、前記第2回路基板の前記複数の電極と弾性的に接触することにより前記第1回路基板と前記第2回路基板を電気的に接続するための複数の接触端子と、  
前記溝の前記回転方向に対向する壁面の開口部近傍に、この開口部が広くなるように前記ハウジングと一体形成された斜面部と、を備えるコネクタ。

【請求項5】前記斜面部は、前記溝の壁面に配置された前記複数の接触端子の直下に形成されている請求項4記載のコネクタ。  
【請求項6】第1回路基板に接続されるべき複数の電極

が形成された第1端部とこの第1端部に対向する第2端部を有する第2回路基板を、第1回路基板に接続するためのコネクタであって、  
絶縁性材料からモールド成形されたハウジングと、  
第2回路基板の第1端部を収容するために、前記ハウジングと一体成形された溝と、  
前記第2回路基板の前記第1端部を前記溝に挿入して、この第1端部を軸として第2回路基板の前記第2端部を所定方向に回転させたときに、前記第2回路基板をその両側縁から挟持するために、前記溝の両端部の近傍から延出されるように前記ハウジングに設けられたラッチ部材と、  
前記溝の底部近傍の、少なくとも前記回転方向に対向する壁面に配置され、前記第2回路基板の前記複数の電極と弾性的に接触することにより前記第1回路基板と前記第2回路基板を電気的に接続するための複数の接触端子と、  
前記溝の前記回転方向に対向する壁面の開口部近傍に、この開口部が広くなるように前記ハウジングと一体形成された段差部と、を備えるコネクタ。

【請求項7】前記第2回路基板の第1端部の縁には面取り加工が施されている請求項6記載のコネクタ。  
【請求項8】前記ラッチ部材は、前記第2回路基板が前記第1回路基板に沿って延在するように、この第2回路基板を支持する請求項1ないし7のいずれかに記載のコネクタ。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、メモリカードやICカードを実装基板に接続するためのコネクタに関する。

## 【0002】

【従来の技術】コンピュータや電気通信機器などに機能を拡張するために、回路基板とメモリカードやICカード等を相互に接続するコネクタは、「カードエッジコネクタ」と称され、一般的に用いられている。

【0003】図7に、従来のコネクタの部分的断面図を示す。回路基板65に装着されるコネクタは、絶縁性ハウジング51を有しており、このハウジング51には、カード60の一端部を収容するための溝52が形成されている。この溝52の内部には、回路基板65の各端子と電気的に接続された複数の接触端子53が配置されている。

【0004】このコネクタにカード60を装着する際には、まず、カード60の一端部60aを回路基板65に対して斜め方向から溝52の開口部に挿入し、カード60を溝52の回路基板65側の壁面（以下、「ガイド面」と称する）52bに沿って、図中a方向に移動させる。そして、この溝52に挿入されたカード60の端部60aの側縁方向（紙面に直交する方向）を軸として、

このカード60を回路基板65の表面に向かって、すなわち図中b方向に押し下げるにより、当該カード60が回路基板65表面に対して略平行となるように、コネクタに装着する。このとき、溝52内に挿入されたカード60表面の端部60a近傍に設けられた図示せぬ複数の半田パッドが、溝52の内部に配置された接触端子53と弾性的に接触する。

## 【0005】

【発明が解決しようとする課題】上述したような従来のコネクタの構造では、カード60のコネクタへの装着の際に、カード60を溝52に挿入して図中b方向に押し下げる、カード60の溝52内に挿入された端部60aは、図7に示すように、b'方向に動く。このとき、図中丸印で囲まれた部分に示されるように、端部60aの側縁は溝52の底部52aに当接した状態で動かされる。このため、カード60の端部60aによって溝52の底部52a、すなわちハウジング材料の一部が削られてしまう。このようにして発生するハウジング材料の削りかすが、カード60の各端子と、溝52内の各接触端子53との間に入り込むことにより、各電極-接触端子間の接触不良を引き起こす場合がある。

【0006】また、図8は、溝52内にカード60を挿入する際に生じる問題を説明するための、図7の溝52のガイド面52b近傍を示す模式的断面図である。この図8中点線で示すように、カード60を溝52のガイド面52bに当接させて、図中のa方向に移動させる際に、カード60の側縁部が接触端子53を座屈させてしまい、このために、各電極-接触端子間の接触不良が生じるという問題もある。この問題を解消するために、各接触端子53のガイド面52aに対する角度を寝かせて配置するという方法が挙げられる。しかしながら、この方法を採用すると、結果的に接触端子53の先端が長くなる。このため、カード60の各電極と各接触端子53とが弾性的に接触することにより、ガイド面52bに配置された各接触端子53が回路基板65側に押し下げられたときに、各端子53の先端がアンカーパーに接触てしまい、装置の性能低下の原因となっていた。

【0007】そこで、上述したような、カードをコネクタに装着する際に生じる問題を防止することにより、信頼性の高いコネクタを提供することを、本発明の課題とする。

## 【0008】

【課題を解決するための手段】上記課題を解決するための本発明によるコネクタの第1の態様は、第1回路基板に接続されるべき複数の電極が形成された第1端部とこの第1端部に対向する第2端部を有する第2回路基板を、第1回路基板に接続するためのコネクタであって、絶縁性材料からモールド成形されたハウジングと、第2回路基板の第1端部を収容するために、前記ハウジングと一体成形された溝と、前記第2回路基板の前記第1端部を前記溝に挿入して、この第1端部を軸として第2回路基板の前記第2端部を所定方向に回転させたときに、前記第2回路基板をその両側縁から挟持するために、前記溝の両端部の近傍から延出されるように前記ハウジングに設けられたラッチ部材と、前記溝の底部近傍の少なくとも一方の壁面に配置され、前記第2回路基板の前記複数の電極と弾性的に接触することにより前記第1回路基板と前記第2回路基板を電気的に接続するための複数の接触端子と、前記溝の底部の幅方向に延在するように前記ハウジングと一体成形された凸部とを備える（請求項1に対応）。

【0009】すなわち、本第1態様のコネクタは、第2回路基板を収容するための溝の底部に、この底部の幅方向に延在する凸部を有していることを特徴としている。このため、第2回路基板を当該溝に挿入した場合に、この溝に挿入された第2回路基板の第1端部は、溝底部に形成された凸部にのみ当接する。従って、第2回路基板をコネクタに装着する場合の、第2回路基板の第1端部のコネクタとの接触面積を減少させることができると、第2回路基板とハウジングとの摩擦により発生する削りかすに起因する接触不良等の問題を防止することができる。

【0010】なお、上記第1態様のコネクタを採用する際には、前記凸部は、前記溝の底部において、前記壁面の複数の接触端子が配置されていない部分に対向する位置に複数形成されているものであってもよいし（請求項2に対応）、前記溝の底部の長さ方向の両端部近傍に形成されているものであってもよい（請求項3に対応）。このような構成を採用することにより、削りかすの発生箇所を接触端子から離れた場所に限定することができるため、接触不良等の問題が発生しにくくなる。

【0011】また、上記課題を解決するための、本発明のコネクタの第2の態様は、第1回路基板に接続されるべき複数の電極が形成された第1端部とこの第1端部に対向する第2端部を有する第2回路基板を、第1回路基板に接続するためのコネクタであって、絶縁性材料からモールド成形されたハウジングと、第2回路基板の第1端部を収容するために、前記ハウジングと一体成形された溝と、前記第2回路基板の前記第1端部を前記溝に挿入して、この第1端部を軸として第2回路基板の前記第2端部を所定方向に回転させたときに、前記第2回路基板をその両側縁から挟持するために、前記溝の両端部の近傍から延出されるように前記ハウジングに設けられたラッチ部材と、前記溝の底部近傍の、少なくとも前記回転方向に對向する壁面に配置され、前記第2回路基板の前記複数の電極と弾性的に接触することにより前記第1回路基板と前記第2回路基板を電気的に接続するための複数の接触端子と、前記溝の前記回転方向に對向する壁面の開口部近傍に、この開口部が広くなるように前記ハウジングと一体成形された斜面部とを備える（請求項4

に対応)。

【0012】すなわち、本態様のコネクタは、第2回路基板を収容するための溝の開口部近傍に、この開口部が広くなるように形成された斜面部が形成されているため、溝内に配置された接触端子を座屈してしまうことを防止することができる。

【0013】なお、上記第2態様のコネクタを採用する際には、前記斜面部は、前記溝の壁面に配置された前記複数の接触端子の直下に形成されているものであってもよい(請求項5に対応)。

【0014】また、上記課題を解決するための、本発明のコネクタの第3の態様は、第1回路基板に接続されるべき複数の電極が形成された第1端部とこの第1端部に対向する第2端部を有する第2回路基板を、第1回路基板に接続するためのコネクタであって、絶縁性材料からモールド成形されたハウジングと、第2回路基板の第1端部を収容するために、前記ハウジングと一体成形された溝と、前記第2回路基板の前記第1端部を前記溝に挿入して、この第1端部を軸として第2回路基板の前記第2端部を所定方向に回転させたときに、前記第2回路基板をその両側縁から挟持するため、前記溝の両端部の近傍から延出されるように前記ハウジングに設けられたラッチ部材と、前記溝の底部近傍の、少なくとも前記回転方向に對向する壁面に配置され、前記第2回路基板の前記複数の電極と弾性的に接触することにより前記第1回路基板と前記第2回路基板を電気的に接続するための複数の接触端子と、前記溝の前記回転方向に對向する壁面の開口部近傍に、この開口部が広くなるように前記ハウジングと一体形成された段差部と備える(請求項6に対応)。このような構成のコネクタを採用した場合でも、第2態様のコネクタと同様に、接触端子の座屈を防止することができる。このとき、前記第2回路基板の第1端部の縁には面取り加工が施されていることが望ましい(請求項7に対応)。

【0015】なお、上記各態様のコネクタを用いる場合には、前記ラッチ部材は、前記第2回路基板が前記第1回路基板に沿って延在するように、この第2回路基板を支持するものであってもよい(請求項8に対応)。

【0016】

【発明の実施の形態】以下、図面に基づいて、本発明の実施の形態を説明する。図1は、本発明の実施形態によるコネクタ10と、このコネクタ10に接続されるカード20の構造を示す斜視図であり、図2は、コネクタ10の長手方向に垂直な面に沿った断面図である。また、図3は、図2のX-X線に沿った断面図である。以下、図1ないし図3を用いて、本発明の第1実施形態によるコネクタの構造を説明する。このコネクタ10はメモリ制御ボードなどの回路基板25上に実装された状態で使用される。

【0017】第2回路基板としてのカード20は、例え

ばDIMM(dual inline memory module)であり、図示せぬ複数の回路が形成されたカード基板21と、この基板21上に形成された複数の半田パッド22を有している。各半田パッド22は、カード基板21の長手方向の一方の側縁21aの両面上に、並べて形成されている。半田パッド22は、カード基板21の両面の長手方向の中央近傍を除いて、ほぼ等間隔で配置されている。また、カード基板21の短手方向の両側縁には、このカード基板21の一部を半円状に切り欠いてなる欠切部21aが形成されている。

【0018】カード20を第1回路基板としての回路基板25に接続するためのコネクタ10は、プラスティック材料等の絶縁性材料をモールド成形してなるハウジング11を備える。ハウジング11は、矩形の平面形状を有する基部11aと、この基部11aの長手方向の両端部から直角方向に延出された2本の側部壁11bとから構成される。基部11aは、カード20の半田パッド22が形成された側縁を収容するための溝12を有している。この溝12内部の両壁面上には、カード20の半田パッド22と接触すべき複数の接触端子13および16が配置されている。これら各接触端子13、16の一端部は、それぞれ、ハウジング11を貫通して外部に延出されており、回路基板25の図示せぬ各端子と半田接合されている。

【0019】ハウジング11の側部壁11bの先端付近には、溝12内に挿入されたカード20の欠切部21bと嵌合すべき嵌合支持部11cが形成されている。これら側部壁11bおよび嵌合支持部11cは、溝12内に挿入されたカード20の短手方向の側縁部をラッチ保持することにより挟持するラッチ部材を構成する。

【0020】また、ハウジング11に形成された溝12の底部12aには、この溝12の幅方向に延在する複数の凸部14が形成されている。図4は、凸部14の構造を説明するための、溝12内部の部分的斜視図である。なお、この図4中では、各接触端子16の図示を省略している。

【0021】図3および図4に示すように、凸部14は、溝12の底部12aに対して僅かに突出しており、コネクタ10を実装する回路基板25表面に対して垂直方向に、すなわち、この溝12の幅方向に延在するように、ハウジング11と一緒にモールド成形されている。これら各凸部14は、溝12の底部12aの長さ方向の両端部および略中央部分に形成されている。すなわち、各凸部14は、溝12の底部12aにおいて、壁面12b、12cの各接触端子13が形成されていない部分に對向する位置に形成されている。従って、溝12に挿入されたカード20の側縁21aは、これら各凸部14にのみ当接される。

【0022】また、図2および図4に示すように、溝12の壁面12b(以下、「ガイド面12b」と表記す

る)は、カード20を回路基板25に対して斜め方向に向けてこの溝12に挿入するために、溝12の開口部の幅を小さくするように形成された傾斜部17が形成されている。さらに、このガイド面12bは、溝12の開口部近傍に、この溝12の開口部が広くなるように形成された斜面部15を有している。

【0023】以下、図1ないし図4を用いて、本実施形態のコネクタ10へのカード20の装着方法を説明する。まず、カード20の半田パッド22が形成された側縁21aをコネクタ10の溝12の開口部に挿入する。このとき、カード20の側縁21aはガイド面12bに当接する。このように、カード20の側縁21aをガイド面12bに当接させながら、溝12の底部12aに向かって、図2中A方向に移動させる。

【0024】すると、カード20は、ガイド面12bの斜面部15によって図2中左斜め上方に付勢される。これにより、カード20の迎え角を小さくすることができるため、接触端子16に加えられる力を従来よりも小さく抑えることができる。よって、カード20を溝12に挿入する際でも、接触端子16が座屈されるのを防ぐことができる。

【0025】図2に示すように、カード20が完全に溝12内部に挿入されると、カード20の側縁21aは溝12の底部12aに形成された複数の凸部14に当接する。この状態で、カード20の長手方向(図2の紙面に直交する方向)を軸として、溝12の外部に延出された他端部を回路基板25側に、すなわち図中B方向に回転させる。すると、カード20の欠切部21bがコネクタ10の側部壁11bの嵌合支持部11cに嵌合し、これにより、図2中1点鎖線で示すように、カード20は回路基板25に対して略平行な状態で保持される。このとき、カード基板21の側縁に設けられた複数の半田パッド22とコネクタ10の溝12内部に配置された複数の接触端子13、16とが、それぞれ、弾性的に接触する。

【0026】また、カード20が図中B方向に回転されると、溝12内に挿入されたカード20の側縁21aは図中B'方向に回転される。前述したように、このとき、カード20の側縁21aは、溝12の底部12aに形成された凸部14にのみ当接しているため、側縁21aがB'方向に回転された場合に、ハウジング11を構成する絶縁材料がカード20の側縁20aによって削られる箇所は、凸部14に限定される。また、この凸部14は、各接触端子16が配置されていない、溝12の底部12aの長さ方向の両端部および中央部に形成されている。従って、カード20によってこの凸部14が削られた場合でも、各接触端子13、16の直近で削りかすが発生することはない。従って、カード20をコネクタ10に装着する際に、カード20の各半田パッド22とコネクタ10の各接触端子13、16との間に削りかす

が入り込むことを防ぐことができる。よって、半田パッド22と各接触端子13、16の接触不良による装置の性能低下を防ぐことができる。

【0027】図5および図6は、本発明の実施形態によるコネクタの变形例を示す部分的断面図である。上記実施形態では、カード20をコネクタに装着する際の接触端子16の座屈防止のための斜面部15は、これら各接触端子16よりも溝12の開口部側に形成されている。しかし、これに限らず、図5に示すように、溝12のガイド面12b上において、各接触端子16の直下に斜面部31を形成した場合でも、同様の効果が得られる。また、図6に示すように、側縁部に面取りが施されたカード20'を用いた場合には、溝12のガイド面12b上の接触端子16よりも開口部側の位置に、この開口部を広げる段差部32が形成されていても、同様に、各接触端子16の座屈防止の効果を得ることができる。

#### 【0028】

【発明の効果】本発明によれば、カードをコネクタに装着する際に接触端子を座屈させることのない、信頼性の高いコネクタを提供することができる。また、本発明によれば、カードをコネクタに装着する際に、当該カードによってハウジングが削られるために発生する削りかすに起因する接触不良を防ぐことができる。

#### 【図面の簡単な説明】

【図1】 本発明の実施形態によるコネクタの構成を示す斜視図。

【図2】 本発明の実施形態によるコネクタの長手方向に垂直な面に沿った部分的断面図。

【図3】 図2のX-X線に沿った断面図。

【図4】 本発明の実施形態によるコネクタの溝12内部の構造を示す部分的斜視図。

【図5】 本発明の実施形態によるコネクタの接触端子16近傍の部分的断面図。

【図6】 本発明の実施形態によるコネクタの接触端子16近傍の部分的断面図。

【図7】 従来技術のコネクタの構造を示す断面図。

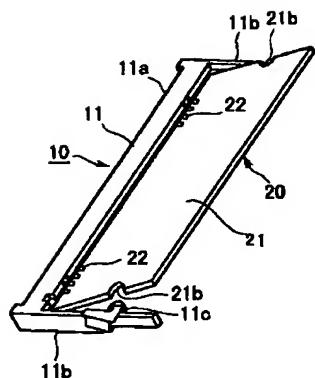
【図8】 従来技術の問題点を説明するための断面図。

#### 【符号の説明】

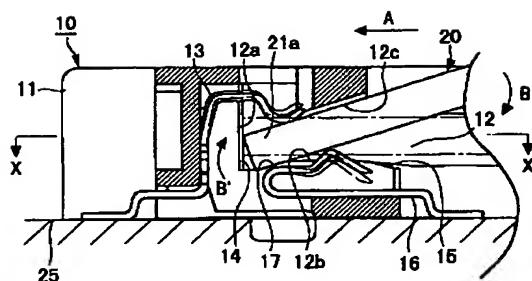
- |    |            |
|----|------------|
| 10 | コネクタ       |
| 40 | 11 ハウジング   |
|    | 12 溝       |
|    | 12a 底部     |
|    | 12b ガイド面   |
|    | 13、16 接触端子 |
|    | 14 凸部      |
|    | 15、31 斜面部  |
|    | 20、20' カード |
|    | 21 カード基板   |
|    | 22 半田パッド   |
| 50 | 25 回路基板    |

## 3.1 段差部

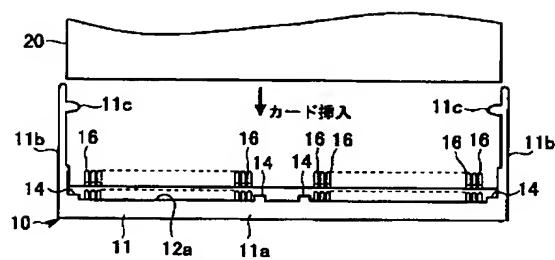
【図1】



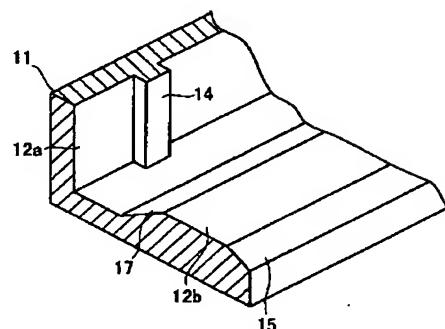
【図2】



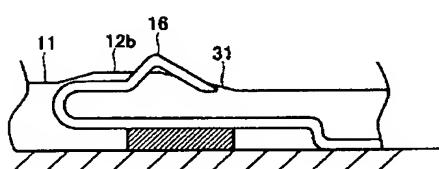
【図3】



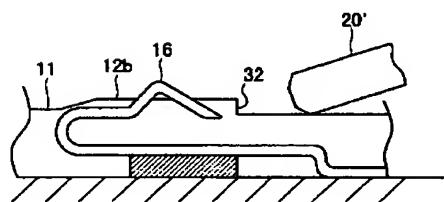
【図4】



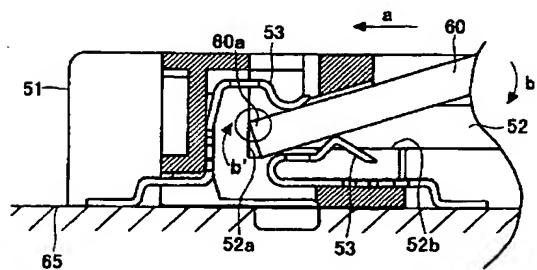
【図5】



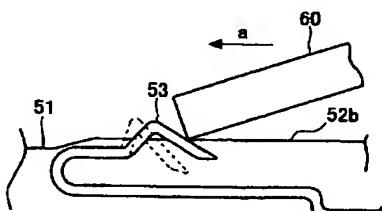
【図6】



【図7】



【図8】



フロントページの続き

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